Wisconsin Department of Natural Resources Health Care Initiative Fact Sheet (PUB WA-1258 2008)

Managing Chemotherapy Waste

Introduction

Chemotherapy waste includes chemotherapy drugs, their containers (vials, bottles, other packaging) and items contaminated with chemotherapy drugs, such as IV bags and tubing, syringes, gowns, gloves, sheets and pads. This fact sheet will help you determine if your waste is trace chemotherapy waste, bulk chemotherapy waste, listed hazardous waste or characteristic hazardous waste and provides information on how to manage these different waste types. In this document, chemotherapy waste includes both antineoplastic and cytotoxic wastes.

What chemotherapy wastes are hazardous wastes?

Wastes can be hazardous wastes because of their characteristics (ignitability, corrosivity, reactivity and toxicity) or because they are specifically listed as hazardous waste. Listed hazardous wastes include spent materials (F- and K-listed wastes) and commercial chemical products (U- and P-listed wastes). For more information, see the DNR fact sheet "Evaluating and Managing Pharmaceutical Waste" at http://dnr.wi.gov/files/pdf/pubs/wa/wa1257.pdf.

Nine chemotherapy drugs are listed or characteristic hazardous waste. The following table lists the generic name, brand name and U.S. Environmental Protection Agency (EPA) waste codes for these drugs.

Hazardous Waste Chemotherapy Drugs		
Generic Name	**Brand Name**	**Waste Code**
Arsenic Trioxide	Trisenox	P012, D004
Chlorambucil	Leukeran	U035
Cyclophosphamide	Cytoxan, Neosar	U058
Daunomycin	Daunorubicin, Cerubidin, DaunoXome, Rubidomycin	U059
Diethystilbestrol	DES, Stilphostrol	U089
Melphalan	Alkeran, L-PAM	U150
Mitomycin C	Mitomycin, Mutamycin	U010
Streptozotocin	Streptozocin, Zanosar	U206
Uracil Mustard	Uramustine	U237
Note: This list may not be all-inclusive since new products may be introduced at any time.		

Learn more about hazardous waste in the DNR publication "Is Your Waste Hazardous?" at http://dnr.wi.gov/files/pdf/pubs/wa/wa1152.pdf

Chemotherapy waste contaminated with listed hazardous waste chemotherapy drugs is listed hazardous waste and must be managed as hazardous waste. Chemotherapy waste contaminated with characteristic hazardous waste chemotherapy drugs should be tested to determine if the mixture is a characteristic hazardous waste; if you do not test the chemotherapy waste, you should manage it as characteristic hazardous waste. Containers that held hazardous waste chemotherapy drugs, and do not meet the definition of "empty," are hazardous waste when discarded. For information on empty containers, see DNR's fact sheet on Managing Empty Containers at http://dnr.wi.gov/files/pdf/pubs/wa/wa1256.pdf.

How should my facility manage chemotherapy wastes?

Unused, expired or discontinued chemotherapy drugs
You may donate unused or discontinued chemotherapy drugs as product to pharmacies or medical facilities participating in the cancer drug repository program. The drugs must be more than six months from their expiration date and in their original, unopened tamper-evident unit dose packaging. Additional information about the cancer drug repository program can be found on the Department of Health Web site at: http://www.dhs.wisconsin.gov/bqaconsumer/cancerdrugrepository.htm.

You may return chemotherapy drugs to the manufacturer or a reverse distributor for credit or as a product. Chemotherapy drugs are only eligible for reverse distribution if they are not leaking or partially used liquids or pastes and do not display any other characteristics that would likely make them ineligible for return. Do not mix drugs eligible for return with other non-returnable pharmaceuticals. Get additional information on reverse distribution at: http://dnr.wi.gov/topic/waste/hazardousfaq.html#no13

What is the difference between trace and bulk chemotherapy waste?

Trace chemotherapy wastes fall into two categories:

- Items contaminated with residual amounts of chemotherapy drugs, such as empty drug bottles, drug dispensing devices or IV bags and tubing.
- Gloves, gowns, masks, goggles and other disposable items used when administering chemotherapy drugs if chemotherapy drugs have not spilled, leaked or dripped on them.

Bulk chemotherapy waste is any waste contaminated with more than residual amounts of chemotherapy drugs. Examples include:

- drug dispensing devices or IV bags that are not completely empty;
- gloves, gowns or other materials that have chemotherapy drugs spilled on them; and
- spill cleanup materials.

Chemotherapy drugs that can no longer be used and cannot be donated to the cancer drug repository program or returned to the manufacturer or reverse distributor are considered waste. Manage chemotherapy waste that is a listed or characteristic hazardous waste as hazardous waste. Use the attached Flow Chart Evaluation Tool to determine whether the chemotherapy waste you generate is hazardous waste.

Trace chemotherapy waste

Segregate the different wastes; if you mix nonhazardous trace chemotherapy waste with infectious waste or solid waste, the mixture must be managed as trace chemotherapy waste (i.e., incinerated). Manage nonhazardous trace chemotherapy waste as follows:

- Place all trace chemotherapy waste in rigid, puncture-resistant plastic containers labeled "trace chemotherapy" and "incinerate only" and send it to a medical waste, solid waste or municipal waste incinerator approved to take the waste.
- Place soft trace chemotherapy waste, including items like gloves, disposable gowns, towels, empty IV bags and tubing, in either a rigid plastic container or a tear-resistant plastic bag or double plastic bag that meets or exceeds 165 grams resistance and send it to a medical waste, solid waste or municipal waste incinerator approved to take the waste.
- Place sharps contaminated with chemotherapy drugs in a sharps container marked "trace chemotherapy" and "incinerate only" and send the sharps to a medical waste incinerator.

Bulk chemotherapy waste

Chemotherapy waste that is not trace chemotherapy waste or hazardous waste is bulk chemotherapy waste. The DNR strongly recommends you manage nonhazardous bulk chemotherapy waste, including nonhazardous chemotherapy drugs, as trace chemotherapy waste and send it to a medical waste or hazardous waste incinerator.

Can I place all chemotherapy waste in one container for incineration?

Yes. If all chemotherapy waste is placed in one container, it must be managed as hazardous waste unless you have made a determination that only nonhazardous chemotherapy waste is in the container. You may decide to set up two waste chemotherapy containers; one for hazardous chemotherapy waste and one for nonhazardous chemotherapy waste. Send containers of **hazardous** chemotherapy waste to a licensed or permitted hazardous waste incinerator. Label containers of **nonhazardous** chemotherapy waste as containing nonhazardous bulk and trace chemotherapy waste and "incinerate only" and send the containers to a hazardous waste incinerator or medical waste incinerator.

Where can I get more information?

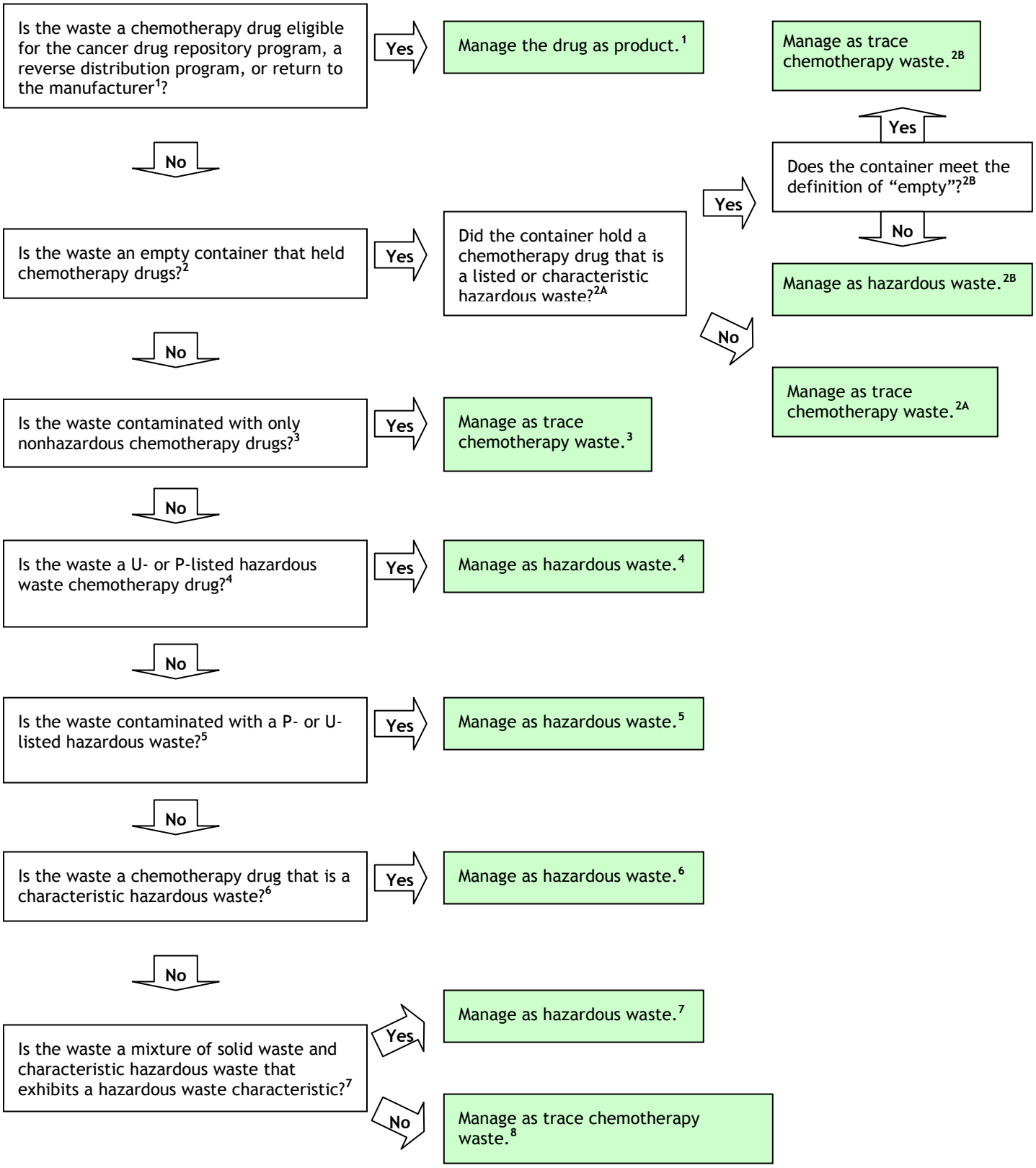
- For information on how to manage other types of waste generated at your facility, visit the DNR "Managing Waste From Health Care Facilities" Web site at http://dnr.wi.gov/topic/HealthWaste/Business.html.
- DNR waste management specialists are available to help you with your questions regarding the management of chemotherapy waste, hazardous waste, infectious waste and medical waste. Go to: http://dnr.wi.gov/staffdir/_newsearch/contactsearchext.aspx?exp=hazardous+waste+requirements to find a waste management specialist near you.
- For information on how to manage other pharmaceutical wastes, DNR fact sheet "Evaluating and Managing Pharmaceutical Waste" at http://dnr.wi.gov/files/pdf/pubs/wa/wa1257.pdf.
- For a list of common wastes, their waste types and disposal methods, see the DNR fact sheet, "Table of Common Wastes in the Health Care Industry" at http://dnr.wi.gov/files/pdf/pubs/wa/wa1259.pdf.
- For general information on environmental management in health care facilities, see the Healthcare Environmental Resource Center Web site at www.hercenter.org.
- For general information on managing chemotherapy wastes, see the Practice Greenhealth Web site at www.practicegreenhealth.org

- To find synonyms of chemotherapy drugs, see the Chemfinder Web site at http://www.chemfinder.com
- For information on proper handling of antineoplastic and other hazardous drugs, see NIOSH "Hazardous Drug Alert": http://www.cdc.gov/niosh/docs/2004-165/

Bureau of Waste and Materials Management
Wisconsin Department of Natural Resources
PO Box 7921, Madison, WI 53707-7921
DNRWasteMaterials@wisconsin.gov
(608)266-2111

Flow Chart Evaluation Tool: Chemotherapy Waste

This flow chart will help you determine how to manage chemotherapy waste. In addition to this evaluation, you will need to determine whether the waste is also regulated under other rules (e.g., as infectious waste, a controlled substance, radioactive waste, etc.). The flow chart notes contain important information that will help ensure correct evaluation and proper management of chemotherapy waste. Remember, you must evaluate all chemotherapy waste generated at your facility.



Flow Chart Notes

Managing chemotherapy waste as hazardous waste: Hazardous waste has specific management requirements for marking, labeling, time limits for storing, transportation, disposal methods and record-keeping. As a generator of hazardous waste, you must comply with the applicable requirements in shs. NR 660 to 679, Wis. Adm. Code, available at http://dnr.wi.gov/topic/Waste/Laws.html#tabx2. Read about the requirements that apply to small quantity generators at http://dnr.wi.gov/files/pdf/pubs/wa/wa294.pdf and the requirements that apply to very small quantity generator at http://dnr.wi.gov/files/pdf/pubs/wa/wa295.pdf. For more information on what makes a waste hazardous, see "Is Your Waste Hazardous?" (http://dnr.wi.gov/files/pdf/pubs/wa/wa1152.pdf)	
Managing waste as trace chemotherapy waste: Manage nonhazardous trace chemotherapy waste according to the requirements in s. NR 526.055, Wis. Adm. Code. Send trace chemotherapy waste to a solid waste, medical waste or hazardous waste incinerator approved to accept trace chemotherapy waste. Trace chemotherapy waste that is mixed with infectious waste must be managed and incinerated as a trace chemotherapy waste. Alternate methods of treating infectious waste (e.g. mechanical grinding or gas, steam or chemical disinfection) will not destroy the toxic properties of the chemotherapy drugs.	
1	Drugs that can be donated to the cancer drug repository program, sent back to the manufacturer or sent to a reverse distribution program are products since they can still be used for their intended purposes or are eligible for credit. As products, these drugs are not subject to the hazardous waste or solid waste (trace chemotherapy, infectious, medical waste) requirements, but other regulations may apply.
2	Containers (vials, IV bags, bottles and other packaging) are empty when all material has been removed by normal means, such as by pouring or aspirating. An empty container should only contain a few drops or a residue clinging to the sides.
2A	Determine whether the container held a characteristic or P- or U-listed hazardous waste. See flow chart note 4 to determine if the drug is a P- or U- listed hazardous waste. See flow chart note 6 to determine if the drug is a characteristic hazardous waste. Manage empty nonhazardous containers as trace chemotherapy waste.
2B	Since the container held a characteristic or P- or U- listed hazardous waste, you must determine if the container meets the definition of "empty". A container that held a P-listed hazardous waste must be triple rinsed to meet the definition of "empty." A container that held a U-listed or characteristic waste must have less than 3 percent total capacity remaining in the container to be empty. For more information about empty containers, see the DNR fact sheet, Managing Empty Containers at http://dnr.wi.gov/files/pdf/pubs/wa/wa1256.pdf. Manage empty containers as trace chemotherapy waste. Manage non-empty containers as characteristic or listed hazardous waste.
3	Trace chemotherapy waste contains no more than a residue of nonhazardous chemotherapy drugs. Trace chemotherapy waste includes containers that are empty or gloves, masks, gowns or other disposable items used when administering chemotherapy drugs if no spills occurred. If chemotherapy drugs have spilled, dripped or leaked, the item is bulk chemotherapy waste. Best management practice is to manage all nonhazardous bulk chemotherapy waste as trace chemotherapy waste (send to a licensed or approved incinerator).
4	To be a P- or U-listed waste, the discarded drug must be an unused product and the chemical listed as the P- or U-waste must be the sole active ingredient. The active ingredient is the substance that is pharmaceutically active. A mixture of 2 or more chemotherapy drugs containing more than one active ingredient is not P- or U- listed waste. Manage discarded, unused P- or U- listed chemotherapy drugs (e.g. expired drugs) as hazardous waste. Waste residue remaining in a syringe or needle after administration is considered a used chemotherapy drug and is not a P- or U- listed hazardous waste. Containers, such as IV bags or vials, are P- or U- listed hazardous waste unless they meet the definition of empty.
5	Materials contaminated with P- or U-listed hazardous wastes are themselves P- or U-listed hazardous waste by the mixture rule. See the DNR publication "Is Your Waste Hazardous?" (link above) for more information. Manage equipment, garments, absorbents and spill clean-up material contaminated with P- or U-listed waste as hazardous waste.
6	Characteristic hazardous wastes include: • D001 ignitable wastes—liquids having a flash point less than 140˚F, spontaneously combustible nonliquids or flammable gases and oxidizers; • D002 corrosive wastes—aqueous liquids with a pH ≤ 2.0 or ≥ 12.5 or liquids that corrode plain steel at a rate greater than 0.250 inches per year; • D003 reactive wastes—normally unstable materials, materials that react violently with water or detonate, explode or generate toxic gases when mixed with water; and, • D004 to D043 toxic wastes—wastes containing certain metals, organics or pesticides that leach out of the waste under certain conditions at or above maximum allowable concentrations. A mixture of arsenic trioxide and other chemotherapy drugs may be a characteristic hazardous waste for arsenic toxicity (D004). Manage characteristic hazardous waste as hazardous waste.
7	Mixtures of characteristic hazardous waste and solid waste are hazardous waste if the mixture exhibits a hazardous waste characteristic. For example, absorbent materials used to clean up a spill of an arsenic trioxide chemotherapy drug mixture may be a characteristic hazardous waste for arsenic toxicity (D004). Manage mixtures exhibiting a hazardous waste characteristic as hazardous waste.
8	The DNR strongly recommends that all nonhazardous chemotherapy waste be sent to a medical waste incinerator or a solid waste, municipal waste or hazardous waste incinerator approved to accept chemotherapy waste. Sending bulk chemotherapy waste to a solid waste landfill may cause chemotherapy drugs to be released into the liquids seeping through the landfill (leachate). The leachate may be sewered without adequate treatment to destroy the toxic effects of the chemotherapy drugs. Do not dispose of bulk chemotherapy waste with infectious waste since some infectious waste treatment methods will not destroy the toxic properties of the chemotherapy drugs and may lead to chemical exposure of waste handlers.